

Final

Site Investigation Report
Former Smoke Area, Choccolocco Corridor,
Parcel 107(7)

Fort McClellan
Calhoun County, Alabama

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List of Acronyms

See Attachment 1 – List of Abbreviations and Acronyms

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, IT Corporation completed a site investigation (SI) at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site, and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at Parcel 107(7) consisted of the sampling and analyses of two depositional soil samples, four surface soil samples, four subsurface soil samples, three surface water samples, and three sediment samples.

Chemical analyses of samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), indicate that metals, volatile organic compounds (VOC), and semivolatile organic compounds were detected in the various site media. To evaluate whether detected constituents pose an unacceptable risk to human health or the environment, analytical results were compared to the human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan.

The potential threat to human receptors is expected to be low. Although the site is located within an undeveloped area of the Choccolocco Corridor owned by the State of Alabama, the soils data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future land use. With the exception of manganese in three surface soil samples, the metals results that exceeded SSSLs were below their respective background concentration. However, the manganese concentrations were within the range of background values determined by Science Applications International Corporation and do not pose an unacceptable risk to human health. VOC and semivolatile organic compound concentrations in site media were below SSSLs.

The potential impact to ecological receptors is also expected to be minimal. The concentrations of six metals (barium, beryllium, copper, manganese, mercury, and selenium) exceeded ESVs and their respective background concentration in surface and depositional soils sampled at Parcel 107(7). With the exception of beryllium (three sample locations) and copper (one sample location), these metals concentrations were within the range of background values determined by Science Applications International Corporation.

The VOC trichlorofluoromethane was detected in two sediment samples at concentrations exceeding the ESV.

Based on the results of the SI, past operations at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), do not appear to have adversely impacted the environment. The metals and chemical constituents detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT Corporation recommends “No Further Action” and unrestricted reuse with regard to hazardous, toxic, and radioactive waste at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC) located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE), Mobile District. The USACE contracted with IT Corporation (IT) to perform the site investigation (SI) at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), under Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report presents specific information and results compiled from the SI, including field sampling and analysis, conducted at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

1.1 Project Description

The Former Smoke Area, Choccolocco Corridor was identified as an area to be investigated prior to property transfer. The site was classified as a Category 7 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 sites are areas that are not evaluated and/or that require further evaluation.

A site-specific field sampling plan (SFSP) attachment (IT, 1998a) and a site-specific safety and health plan (SSHP) attachment were finalized in October 1998. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998b) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included fieldwork to collect two depositional soil samples, four surface soil samples, four subsurface soil samples, three surface water samples, and three sediment samples. Data from the field investigation were used to determine whether potential site-specific chemicals are present at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

1.2 Purpose and Objectives

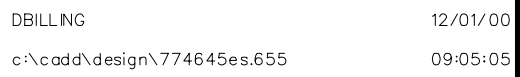
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), at concentrations that would present an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b).

Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide to propose “No Further Action” at the site or to conduct additional work at the site.

1.3 Site Description and History

The Former Smoke Area, Choccolocco Corridor, Parcel 107(7), is located along the southern boundary of the Choccolocco Corridor, on the east side of Morrison Hill (Figure 1-1). The parcel covers approximately 5 acres. Training activities conducted at the site involved the use of smoke generators and fog oil. The dates of use at the Former Smoke Area, Choccolocco Corridor, could not be determined exactly but the site was used periodically from 1961 until approximately 1972. The site is located on a gentle, east-facing slope of Morrison Hill and lies at an elevation of approximately 750 feet above mean sea level. A small, unnamed tributary to Choccolocco Creek is located just north of the site. A dirt road and an east-flowing surface drainage feature run through the southern portion of the parcel (Figure 1-2). The site and surrounding area are mostly undeveloped and heavily wooded.



2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).
2. Areas where only release or disposal of petroleum products has occurred.
3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response.
4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken.
5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken.
6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented.
7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management, the U.S. Environmental Protection Agency (EPA) Region IV, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and

military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Former Smoke Area, Choccolocco Corridor, was classified as a Category 7 CERFA site: areas that are not evaluated or require further evaluation. The site lacked adequate documentation and therefore required evaluation to determine the environmental condition of the parcel. There have not been any investigations identified for the Former Smoke Area, Choccolocco Corridor.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), including environmental sampling and analysis.

3.1 Environmental Sampling

The environmental sampling performed during the SI at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), included the collection of surface and depositional soil samples, subsurface soil samples, and surface water and sediment samples for chemical analyses. The sample locations were determined by observing site physical characteristics noted during a site walkover and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.3.

3.1.1 Surface and Depositional Soil Sampling

Surface soil samples were collected from four locations and depositional soil samples were collected from two locations at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). Soil sampling locations and rationale are presented in Table 3-1. Sampling locations are shown on Figure 3-1. Sample designations and quality assurance/quality control (QA/QC) samples are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, site topography, and buried utilities.

Sample Collection. Surface and depositional soil samples were collected from the upper 1 foot of soil with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9.1.1 of the SAP (IT, 2000a). The samples were collected by first removing surface debris, such as rocks and vegetation, from the immediate sample area. The soil was then collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP (IT, 2000a). Samples for volatile organic compound (VOC) analyses were collected directly from the sampler with three EnCore[®] samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3. Sample collection logs are included in Appendix A.

Table 3-1

**Sampling Locations and Rationale
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Media	Sample Location Rationale
FTA-107-GP01	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected from a high elevation within the parcel. This sampling location represents a potential location for smoke generators.
FTA-107-GP02	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected near the northeast corner of the parcel. This sampling location represents a likely point for the collection and infiltration of runoff exiting the site.
FTA-107-GP03	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected at a point midway along the irregular northeastern boundary of the parcel.
FTA-107-GP04	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected from a low elevation within the parcel where runoff may collect before traveling to surface water bodies.
FTA-107-SW/SD01	Surface Water Sediment	Surface water and sediment samples were collected from an upgradient location in the tributary to Choccolocco Creek, which lies immediately north of the site.
FTA-107-SW/SD02	Surface Water Sediment	Surface water and sediment samples were collected from the tributary to Choccolocco Creek, which lies immediately north of the eastern end of the site. This sampling location represents a point of entry for surface water runoff into the stream.
FTA-107-SW/SD03	Surface Water Sediment	Surface water and sediment samples were collected from the tributary to Choccolocco Creek, which lies immediately north of the site. The sampling location represents a downgradient location from the parcel.
FTA-107-DEP01	Depositional Soil	A depositional soil sample was collected from the toe of the slope near the northeast corner of the site. This sampling location represents a likely point of collection for depositional soils sloughing off the parcel towards the unnamed tributary to Choccolocco Creek.
FTA-107-DEP02	Depositional Soil	A depositional soil sample was collected from the toe of the slope near the southeast corner of the site. This sampling location represents a likely point of collection for depositional soils that have sloughed directly downslope from the parcel.

Table 3-2

**Surface, Subsurface, and Depositional Soil Sample Designations and QA/QC Samples
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
FTA-107-GP01	FTA-107-GP01-SS-FZ0001-REG FTA-107-GP01-DS-FZ0002-REG	0-1 1-3			FTA-107-GP01-SS-FZ0001-MS FTA-107-GP01-SS-FZ0001-MSD	TCL VOCs, TCL SVOCs, TAL metals
FTA-107-GP02	FTA-107-GP02-SS-FZ0003-REG FTA-107-GP02-DS-FZ0004-REG	0-1 1-2				TCL VOCs, TCL SVOCs, TAL metals
FTA-107-GP03	FTA-107-GP03-SS-FZ0005-REG FTA-107-GP03-DS-FZ0006-REG	0-1 1-3				TCL VOCs, TCL SVOCs, TAL metals
FTA-107-GP04	FTA-107-GP04-SS-FZ0007-REG FTA-107-GP04-DS-FZ0010-REG	0-1 1-3	FTA-107-GP04-SS-FZ0008-FD	FTA-107-GP04-SS-FZ0009-FS		TCL VOCs, TCL SVOCs, TAL metals
FTA-107-DEP01	FTA-107-DEP01-DEP-FZ0011-REG	0-1				TCL VOCs, TCL SVOCs, TAL metals
FTA-107-DEP02	FTA-107-DEP01-DEP-FZ0012-REG	0-1				TCL VOCs, TCL SVOCs, TAL metals

FD - Field duplicate.

FS - Field split.

ft. bgs - Feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.



3.1.2 Subsurface Soil Sampling

Subsurface soil samples were collected from four soil borings at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and QA/QC samples are listed in Table 3-2. Soil boring sampling locations were determined in the field by the on-site geologist based on sampling rationale, presence of surface structures, site topography, and buried and overhead utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than 1 foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and samples collected using the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000a). Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3.

Subsurface soil samples were collected continuously until direct-push sampler refusal was encountered. Samples were field screened using a PID in accordance with Section 4.7.1.1 of the SAP (IT, 2000a) to measure for volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were not greater than background, the deepest sample interval above the saturated zone was submitted for analyses. Samples to be analyzed for VOCs were collected directly from the sampler with three EnCore[®] samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Samples submitted for laboratory analyses are summarized in Table 3-2. The on-site geologist constructed a detailed boring log for each soil boring. The boring log for each borehole is included in Appendix B.

At the completion of soil sampling, boreholes were abandoned with hydrated bentonite pellets following borehole abandonment procedures outlined in Appendix B of the SAP (IT, 2000a).

3.1.3 Surface Water Sampling

Three surface water samples were collected from an unnamed tributary to Choccolocco Creek to determine if site activities had impacted the creek. The surface water sample locations are shown on Figure 3-1. The surface water sampling locations and rationale are listed in Table 3-1.

Table 3-3

**Surface Water and Sediment Sample Designations and QA/QC Samples
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
FTA-107-SW/SD01	FTA-107-SW/SD01-SW-FZ2001-REG	NA	FTA-107-SW/SD01-SW-FZ2002-FD	FTA-107-SW/SD01-SW-FZ2003-FS		TCL VOCs, TCL SVOCs, TAL metals
	FTA-107-SW/SD01-SD-FZ1001-REG	0 - 0.5				TCL VOCs, TCL SVOCs, TAL metals, TOC, grain size
FTA-107-SW/SD02	FTA-107-SW/SD02-SW-FZ2004-REG	NA			FTA-107-SW/SD02-SW-FZ2004-MS	TCL VOCs, TCL SVOCs, TAL metals
	FTA-107-SW/SD02-SD-FZ1002-REG	0 - 0.5			FTA-107-SW/SD02-SW-FZ2004-MSD	TCL VOCs, TCL SVOCs, TAL metals, TOC, grain size
FTA-107-SW/SD03	FTA-107-SW/SD03-SW-FZ2005-REG	NA				TCL VOCs, TCL SVOCs, TAL metals
	FTA-107-SW/SD03-SD-FZ1003-REG	0 - 0.5				TCL VOCs, TCL SVOCs, TAL metals, TOC, grain size

FD - Field duplicate.

FS - Field split.

ft bgs - Feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

NA - Not applicable.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

TOC - Total organic carbon.

VOC - Volatile organic compound.

The surface water sample designations and QA/QC samples are listed in Table 3-3. The sampling locations were determined in the field based on drainage pathways and actual field observations.

Sample Collection. Surface water samples were collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). The samples were collected by dipping a stainless-steel pitcher in the water and pouring the water into the appropriate sample containers or by dipping the sample containers directly in the water and allowing the water to fill the containers. The samples were collected after field parameters (specific conductivity, dissolved oxygen, redox potential, temperature, turbidity, and pH) had been measured using a Hydrolab[®] water quality unit. The field parameter readings are presented in Table 3-4. The sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.3.

3.1.4 Sediment Sampling

Three sediment samples were collected at the same locations as the surface water samples discussed in Section 3.1.3 (Figure 3-1). The sediment sampling locations and rationale are listed in Table 3-1. The sediment sample designations are listed in Table 3-3. The sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. The sediment samples were collected in accordance with the procedures outlined in Section 4.9.1.2 of the SAP (IT, 2000a). The samples were collected from the upper 0.5-foot of sediment with a stainless-steel spoon and placed in a stainless-steel bowl. Sediment to be analyzed for VOCs was immediately collected from the stainless-steel bowl using three Encore[®] samplers. The remaining portion of the sediment was homogenized and placed in the appropriate sample containers. The sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.3.

3.2 Surveying of Sample Locations

Sample locations were surveyed using global positioning system survey techniques described in Section 4.3 of the SAP (IT, 2000a), and conventional civil survey techniques described in Section 4.19 of the SAP (IT, 2000a). Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were

Table 3-4

**Surface Water Field Parameters
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Date	Specific Conductivity (µmhos/cm)	Dissolved Oxygen (ppm)	Redox Potential (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
FTA-107-SW/SD01	15-Feb-99	15	10.64	300.5	8.88	1.0	4.95
FTA-107-SW/SD02	12-Feb-99	16	9.47	249.0	12.26	1.9	5.34
FTA-107-SW/SD03	12-Feb-99	16	9.61	279.0	12.36	2.0	5.00

°C - Degrees Celsius.

GW - Groundwater.

µmhos/cm - Micromhos per centimeter.

mV - Millivolt.

NTU - Nephelometric turbidity unit.

ppm - Parts per million.

SU - Standard units.

referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix C.

3.3 Analytical Program

Samples collected during the SI were analyzed for various chemical and physical parameters. The specific suite of analyses performed was based on the potential site-specific chemicals historically at the site and EPA, Alabama Department of Environmental Management, FTMC, and USACE requirements. Samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), were analyzed for the following parameters:

- Target compound list VOCs – EPA Method 5035/8260B
- Target compound list semivolatile organic compounds (SVOC) – EPA Method 8270C
- Target analyte list metals – EPA Method 6010B/7000
- Total organic carbon (TOC) – EPA Method 9060 (sediment only)
- Grain size – American Society for Testing Materials Method D421/D422 (sediment only).

The samples were analyzed using EPA SW-846 methods, including Update III methods where applicable, as presented in Table 6-1 in Appendix B of the SAP (IT, 2000a). Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP [IT, 2000a]). Chemical data were reported via hard copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated analytical data is included in Appendix D. The Data Validation Summary Report is included as Appendix E.

3.4 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Chapter 5.0, Table 5-1, of Appendix B of the SAP (IT, 2000a). Sample documentation and chain-of-custodies were recorded as specified in Section 4.13 of the SAP (IT, 2000a).

Completed analysis request and chain-of-custody records (Appendix A) were secured and included with each shipment of sample coolers to Quanterra Environmental Services in Knoxville, Tennessee. Split samples were shipped to the USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.5 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000a). The IDW generated during the SI at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), was segregated as follows:

- Soil boring cuttings
- Decontamination fluids
- Personal protective equipment.

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined rolloff bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, soil boring cuttings and personal protective equipment generated during the SI were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the existing 20,000-gallon sump associated with the Building T-338 vehicle washrack. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonregulated waste to the FTMC wastewater treatment plant on the Main Post.

3.6 Variances/Nonconformances

There were not any variances or nonconformances to the SFSP recorded during completion of the SI at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

3.7 Data Quality

The field sample analytical data are presented in tabular form in Appendix D. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and quality assurance plan; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix A.

Data Validation. A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix E consists of a data validation summary report that was prepared to discuss the results of the validation. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management SystemTM database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs developed by IT. Rejected data (assigned an “R” qualifier) were not used in comparison to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

Subsurface investigations performed at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), provided soil and bedrock data was used to characterize the geology of the site. Because there were not any wells installed at Parcel 107(7), a hydrogeological characterization was not performed.

4.1 Regional and Site Geology

4.1.1 Regional Geology

Calhoun County includes parts of two physiographic provinces: the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold and thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and

conglomerate with interbeds of greenish-gray siltstone and mudstone. Massive to laminated, greenish-gray and black mudstone makes up the Nichols Formation with thin interbeds of siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appear to dominate the unit and consist primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consist of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of the Main Post and consists of interlayered bluish-gray or pale yellowish-gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southwest of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984). The Rome Formation consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded

to laminated, siliceous dolomite and dolomitic limestone that weathers to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites, and limestones, and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish-gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-gray limestone with abundant chert nodules and greenish-gray to grayish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

4.1.2 Site Geology

The soils mapped at Parcel 107(7) are the Jefferson stoney fine sandy loam and Jefferson gravelly fine sandy loam. These soils are generally developed from local alluvium that is derived from sandstone and shale bedrock. The color of these soils ranges from dark gray to brown in the surface soil and yellowish brown in the subsurface soil (U.S. Department of Agriculture, 1961).

The bedrock mapped at Parcel 107(7) is the Rome Formation, which consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite (Osborne et al., 1988).

Based on direct-push soil boring data collected during the SI, soils at the site consist of silty clay to a gravelly, sandy, clayey silt. The description of the soils is consistent with the mapped Jefferson stoney fine sandy loam and Jefferson gravelly fine sandy loam. Gray shale was encountered in one soil boring (FTA-107-GP01) at approximately 5 feet bgs.

4.2 Site Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1998). The major surface water feature in the Choccolocco Corridor is Choccolocco Creek, which flows south through the Choccolocco Corridor.

The site is located on a gentle, east-facing slope of Morrison Hill. Surface runoff from the site follows topography and flows to the east into intermittent surface drainage features within the parcel and into the unnamed tributary to Choccolocco Creek. Choccolocco Creek is located approximately 1 mile east of the parcel. Site elevation is approximately 750 to 780 feet above mean sea level.

5.0 Summary of Analytical Results

The results of the chemical analyses of samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), indicate that metals, VOCs, and SVOCs were detected in the various site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metal concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations are within natural background concentrations. Summary statistics for background metals samples collected at FTMC (SAIC, 1998) are included in Appendix F.

Six compounds were quantified by both SW-846 Method 8260B (as VOC) and Method 8270C (as SVOC), including 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,3-dichlorobenzene, 1,2-dichlorobenzene, hexachlorobutadiene, and naphthalene. Method 8260B yields a reporting limit (RL) of 0.005 milligram per kilogram (mg/kg), while Method 8270C has a RL of 0.330 mg/kg, which is typical for a soil matrix sample. Due to the direct nature of the Method 8260B analysis and its resulting lower RL, this method should be considered superior to Method 8270C when quantifying low levels (0.005 to 0.330 mg/kg) of these compounds. Method 8270C and its associated methylene chloride extraction step is superior, however when dealing with samples that contain higher concentrations (greater than 0.330 mg/kg) of these compounds. Therefore, all data were considered and none were categorically excluded. Data validation qualifiers were helpful in evaluating the usability of data, especially if calibration, blank contamination, precision, or accuracy indicator anomalies were encountered. The validation qualifiers and concentrations reported (e.g., whether concentrations were less than or greater than 0.330 mg/kg) were used to determine which analytical method was likely to return the more accurate result.

The following sections and Tables 5-1 through 5-4 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix D.

Table 5-1

Surface and Depositional Soil Analytical Results
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-107 FTA-107-DEP01 FZ0011 13-Nov-98 0- 1					FTA-107 FTA-107-DEP02 FZ0012 13-Nov-98 0- 1					FTA-107 FTA-107-GP01 FZ0001 28-Oct-98 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	6.27E+03				YES	8.89E+03			YES	YES	7.10E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	2.80E+00			YES		3.00E+00			YES		2.00E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.52E+02		YES			1.27E+02		YES			6.34E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.30E+00		YES		YES	8.80E-01		YES			7.20E-01				
Calcium	mg/kg	1.72E+03	NA	NA	ND					ND					ND				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.04E+01				YES	9.80E+00				YES	6.60E+00	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.29E+01					1.13E+01					7.30E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.01E+02		YES		YES	1.40E+01		YES			4.20E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.22E+04			YES	YES	1.40E+04			YES	YES	1.17E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.04E+01					1.32E+01					9.20E+00				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	ND					ND					ND				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.19E+03			YES	YES	1.15E+03			YES	YES	6.59E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.40E-02					7.10E-02					4.10E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	6.00E+00					6.60E+00					ND				
Potassium	mg/kg	8.00E+02	NA	NA	ND					7.09E+02					ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.40E-01		YES		YES	8.80E-01		YES		YES	7.70E-01		YES		
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	ND					8.40E+00				YES	ND				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.79E+01					3.07E+01					1.26E+01				
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND					2.90E-03	J			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	5.10E-02	J				7.70E-03	B				1.10E-02	J			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.30E+00	J				2.10E-01	J				3.00E-01	J			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					4.00E-03	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	7.40E-03	B				4.50E-03	B				7.20E-03	B			
Styrene	mg/kg	NA	1.55E+03	1.00E-01	6.80E-03	J				ND					ND				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	3.50E-03	J				ND					8.60E-03				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	3.70E-03	J				ND					2.50E-03	J			
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					3.30E-02	J			
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND				

Table 5-1

**Surface and Depositional Soil Analytical Results
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-107 FTA-107-GP02 FZ0003 28-Oct-98 0- 1					FTA-107 FTA-107-GP03 FZ0005 28-Oct-98 0- 1					FTA-107 FTA-107-GP04 FZ0007 28-Oct-98 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.61E+03			YES	YES	1.14E+04			YES	YES	8.82E+03			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	2.80E+00			YES		3.60E+00			YES		3.30E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	2.29E+02		YES		YES	1.38E+02		YES			2.82E+02		YES		YES
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.30E+00		YES		YES	1.40E+00		YES		YES	1.10E+00		YES		YES
Calcium	mg/kg	1.72E+03	NA	NA	1.38E+03					ND					1.82E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	9.30E+00 J			YES		1.68E+01 J				YES	1.17E+01 J				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	8.40E+00					1.07E+01					1.18E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	8.20E+00					1.04E+01					6.80E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.14E+04		YES	YES		2.03E+04			YES	YES	1.63E+04		YES	YES	
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.70E+01					2.00E+01					2.17E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	5.91E+02					5.99E+02					5.97E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.10E+03		YES	YES	YES	1.94E+03		YES	YES	YES	1.93E+03		YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.00E-01		YES		YES	7.90E-02					9.20E-02		YES		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.00E+01					9.30E+00					8.10E+00				
Potassium	mg/kg	8.00E+02	NA	NA	ND					7.76E+02 B					7.27E+02 B				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					6.80E-01		YES			ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	6.70E+00			YES		ND					ND				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	4.33E+01		YES			3.56E+01					3.13E+01				
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	1.60E-02 J					3.80E-02 J					4.60E-02 J				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.60E-01 J					4.40E-01 J					6.20E-01 J				
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					4.40E-03 J					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	4.90E-03 B					9.60E-03 B					8.30E-03 B				
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					3.00E-03 J					3.50E-03 J				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	5.80E-02 B					1.40E-01 B					ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)				FTA-107 FTA-107-GP01 FZ0002 28-Oct-98 1-3				FTA-107 FTA-107-GP02 FZ0004 28-Oct-98 1-2				FTA-107 FTA-107-GP03 FZ0006 28-Oct-98 1-3				FTA-107 FTA-107-GP04 FZ0010 28-Oct-98 1-3			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	9.55E+03			YES	8.88E+03			YES	8.96E+03			YES	9.83E+03			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	2.50E+00			YES	3.10E+00			YES	3.40E+00			YES	3.70E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	6.79E+01				9.19E+01				9.52E+01				1.01E+02			
Beryllium	mg/kg	8.60E-01	9.60E+00	7.60E-01				8.40E-01				1.10E+00		YES		8.00E-01			
Chromium	mg/kg	3.83E+01	2.32E+01	9.20E+00	J			9.00E+00	J			1.33E+01	J			1.20E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	9.80E+00				1.11E+01				1.26E+01				7.60E+00			
Copper	mg/kg	1.94E+01	3.13E+02	5.10E+00				7.00E+00				7.80E+00				7.60E+00			
Iron	mg/kg	4.48E+04	2.34E+03	1.52E+04			YES	1.53E+04			YES	1.96E+04			YES	1.90E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.01E+01				9.10E+00				1.05E+01				8.60E+00			
Manganese	mg/kg	1.36E+03	3.63E+02	9.14E+02			YES	5.96E+02			YES	1.05E+03			YES	4.98E+02			YES
Mercury	mg/kg	7.00E-02	2.33E+00	4.30E-02				5.90E-02				5.50E-02				6.40E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	5.50E+00				6.40E+00				7.50E+00				7.70E+00			
Potassium	mg/kg	7.11E+02	NA	6.71E+02	B			6.65E+02	B			9.49E+02		YES		1.07E+03		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	ND				6.90E-01		YES		7.10E-01		YES		7.10E-01		YES	
Zinc	mg/kg	3.49E+01	2.34E+03	1.49E+01				1.89E+01				1.85E+01				1.61E+01			
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				2.60E-03	J			ND			
2-Butanone	mg/kg	NA	4.66E+03	7.60E-03	J			1.80E-02	J			1.50E-02	J			ND			
Acetone	mg/kg	NA	7.76E+02	3.10E-01	J			3.90E-01	J			1.50E+01	J			1.10E+00	J		
Bromomethane	mg/kg	NA	1.09E+01	6.90E-03	J			3.80E-03	J			6.40E-03	J			ND			
Methylene chloride	mg/kg	NA	8.41E+01	4.40E-03	B			4.40E-03	B			4.70E-03	B			4.30E-03	B		
Toluene	mg/kg	NA	1.55E+03	ND				9.20E-03				2.30E-03	J			ND			
p-Cymene	mg/kg	NA	1.55E+03	ND				1.90E-02	J			ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	5.10E-02	B			ND				6.00E-02	B			ND			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

Surface Water Analytical Results
Former Smoke Area, Choccolocco Corridor, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date					FTA-107 FTA-107-SW/SD01 FZ2001 15-Feb-99					FTA-107 FTA-107-SW/SD02 FZ2004 12-Feb-99					FTA-107 FTA-107-SW/SD03 FZ2005 12-Feb-99				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	9.34E-02	B			YES	1.12E-01	B			YES	1.01E-01	B			YES
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	1.83E-02	J			YES	1.92E-02	J			YES	2.00E-02	J			YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	3.71E-01	J				4.00E-01	J				4.17E-01	J			
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	ND					7.32E-02	B				ND				
Magnesium	mg/L	1.10E+01	NA	8.20E+01	2.95E-01	J				3.31E-01	J				3.35E-01	J			
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	3.90E-03	J				4.30E-03	J				4.30E-03	J			
Potassium	mg/L	2.56E+00	NA	5.30E+01	1.03E+00	J				1.65E+00	B				1.68E+00	B			
Sodium	mg/L	3.44E+00	NA	6.80E+02	7.72E-01	B				9.74E-01	B				1.15E+00	B			
VOLATILE ORGANIC COMPOUNDS																			
Naphthalene	mg/L	NA	2.04E-01	6.20E-02	ND					3.60E-04	B				ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama, July*.

^b Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July*.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

Sediment Analytical Results
Former Smoke Area, Choccolocco Coordior, Parcel 107(7)
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-107 FTA-107-SW/SD01 FZ1001 12-Feb-99 0-.5					FTA-107 FTA-107-SW/SD02 FZ1002 12-Feb-99 0-.5					FTA-107 FTA-107-SW/SD03 FZ1003 12-Feb-99 0-.5				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	1.71E+03					1.39E+03					2.43E+03				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	1.50E+00					9.30E-01	J				2.10E+00				
Barium	mg/kg	9.89E+01	8.36E+04	NA	3.46E+01					2.23E+01	J				3.30E+01				
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	3.90E-01	J				2.30E-01	J				4.80E-01	J			
Calcium	mg/kg	1.11E+03	NA	NA	1.22E+02	J				6.73E+01	J				1.11E+02	J			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	3.30E+00					2.00E+00					9.00E+00				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	2.80E+00	J				2.40E+00	J				2.80E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	4.00E+00					2.30E+00	J				4.40E+00				
Iron	mg/kg	3.53E+04	3.59E+05	NA	8.20E+03					4.57E+03					9.49E+03				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	3.80E+00					3.00E+00					5.00E+00				
Magnesium	mg/kg	9.06E+02	NA	NA	1.01E+02	J				7.69E+01	J				1.10E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	2.12E+02					1.16E+02					1.44E+02				
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	1.80E-02	J				1.60E-02	J				2.60E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	2.50E+00	J				1.50E+00	J				2.10E+00	J			
Potassium	mg/kg	1.01E+03	NA	NA	4.38E+02	J				3.20E+02	J				3.95E+02	J			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	6.80E-01	J				ND					7.20E-01		YES		
Sodium	mg/kg	6.92E+02	NA	NA	7.70E+01	B				9.11E+01	B				7.80E+01	B			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	5.40E+00	J				3.70E+00	J				9.20E+00				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	7.30E+00					4.30E+00					6.50E+00				
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	6.23E+05	1.37E-01	1.50E-02	J				6.10E-03	J				8.20E-03	J			
Acetone	mg/kg	NA	1.03E+05	4.53E-01	3.10E-01	J				1.60E-01	J				1.90E-01	J			
Cumene	mg/kg	NA	1.04E+05	NA	ND					6.50E-03	J				ND				
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	4.00E-03	B				4.00E-03	B				3.70E-03	B			
Trichlorofluoromethane	mg/kg	NA	3.06E+05	3.07E-03	4.50E-03	J			YES	ND					4.60E-03	J			YES

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

5.1 Surface and Depositional Soil Analytical Results

Four surface soil samples and two depositional soil samples were collected for chemical analyses at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). Surface and depositional soil samples were collected from the upper 1-foot of soil at the locations shown on Figure 3-1.

Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-1.

Metals. Eighteen metals were detected in surface and depositional soil samples collected at the site. The concentrations of four metals (aluminum, arsenic, iron, and manganese) exceeded SSSLs. With the exception of manganese at three sample locations (FTA-107-GP02, FTA-107-GP03, and FTA-107-GP04), the concentrations of these metals were below the respective background concentration. However, the manganese results were within the range of background values determined by SAIC (1998) (Appendix F).

The concentrations of ten metals (aluminum, barium, beryllium, chromium, copper, iron, manganese, mercury, selenium, and vanadium) exceeded ESVs. Of these metals, barium (two sample locations), beryllium (four sample locations), copper (one sample location), manganese (three sample locations), mercury (one sample location), and selenium (two sample locations) exceeded their respective background concentration. With the exception of beryllium at three sample locations (FTA-107-GP02, FTA-107-GP03, and FTA-107-GP04) and copper at one sample location (FTA-107-DEP01), the concentrations of these metals were within the range of background values determined by SAIC (1998) (Appendix F).

Volatile Organic Compounds. Nine VOCs (1,2,4-trimethylbenzene, 2-butanone, acetone, bromomethane, methylene chloride, styrene, toluene, trichlorofluoromethane, and p-cymene) were detected in surface and depositional soil samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). The majority of the VOC results were flagged with a “J” data qualifier indicating that the results were greater than the method detection limit (MDL) but less than the RL. The methylene chloride results and one of the 2-butanone results were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank. Methylene chloride is a common laboratory contaminant. Sample locations FTA-107-GP01 and FTA-107-DEP01 contained eight and seven VOCs, respectively, of the nine detected VOCs.

The VOC concentrations in surface and depositional soils were below SSSLs and ESVs.

Semivolatile Organic Compounds. The SVOC bis(2-ethylhexyl)phthalate was detected in the surface soil samples collected at FTA-107-GP02 and FTA-107-GP03. The bis(2-ethylhexyl)phthalate results were flagged with a “B” data qualifier, signifying that this compound was also detected in an associated laboratory or field blank. Bis(2-ethylhexyl)phthalate is a common laboratory contaminant.

The bis(2-ethylhexyl)phthalate results were below the SSSL and ESV.

5.2 Subsurface Soil Analytical Results

Four subsurface soil samples were collected for chemical analyses at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). Subsurface soil samples were collected at depths greater than 1-foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. Fifteen metals were detected in subsurface soil samples collected at the site. With the exception of selenium at one location, the detected metals were present in each of the samples. The concentrations of four metals (aluminum, arsenic, iron, and manganese) exceeded SSSLs but were below their respective background concentration.

Volatile Organic Compounds. Seven VOCs (1,2,4-trimethylbenzene, 2-butanone, acetone, bromomethane, methylene chloride, toluene, and p-cymene) were detected in subsurface soil samples collected at the site. The majority of the VOC results were flagged with a “J” data qualifier indicating that the results were greater than the MDL but less than the RL. The methylene chloride results were flagged with a “B” data qualifier, signifying that methylene chloride was also detected in an associated laboratory or field blank. Methylene chloride is a common laboratory contaminant. Sample locations FTA-107-GP02 and FTA-107-GP03 each contained six of the seven detected VOCs.

The VOC concentrations in subsurface soils were below SSSLs.

Semivolatile Organic Compounds. The SVOC bis(2-ethylhexyl)phthalate was detected in the subsurface soil samples collected at FTA-107-GP01 and FTA-107-GP03. The bis(2-ethylhexyl)phthalate results were flagged with a “B” data qualifier, signifying that this compound was also detected in an associated laboratory or field blank. Bis(2-ethylhexyl)phthalate is a common laboratory contaminant.

The bis(2-ethylhexyl)phthalate results were below the SSSL.

5.3 Surface Water Analytical Results

Three surface water samples were collected for chemical analyses from the unnamed tributary to Choccolocco Creek at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). The surface water sample locations are shown on Figure 3-1. The analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-3.

Metals. Eight metals were detected in surface water samples collected at the site. The aluminum results, sodium results, and two potassium results were flagged with a “B” data qualifier, signifying that these metals were also detected in an associated laboratory or field blank. The remaining metals results were flagged with a “J” data qualifier indicating that the results were greater than the MDL but less than the RL.

The concentrations of the detected metals were below SSSLs. The concentrations of aluminum and barium exceeded ESVs in each of the samples but were below the respective background concentration.

Volatile Organic Compounds. One VOC (naphthalene) was detected in the surface water sample collected at FTA-107-SW/SD02. The naphthalene result was flagged with a “B” data qualifier, signifying that naphthalene was also detected in an associated laboratory or field blank.

The naphthalene result was below the SSSL and ESV.

Semivolatile Organic Compounds. SVOCs were not detected in the surface water samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

5.4 Sediment Analytical Results

Three sediment samples were collected for chemical and physical analyses at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7). Sediment samples were collected from the upper 0.5-foot of sediment at the locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-4.

Metals. Nineteen metals were detected in sediment samples collected at the site. With the exception of selenium at one location, the detected metals were present in each of the samples.

The concentrations of the metals in sediments were below SSSLs and ESVs.

Volatile Organic Compounds. Five VOCs (2-butanone, acetone, cumene, methylene chloride, and trichlorofluoromethane) were detected in sediment samples collected at the site. The methylene chloride results were flagged with a “B” data qualifier, signifying that methylene chloride was also detected in an associated laboratory or field blank. Methylene chloride is a common laboratory contaminant. The remaining VOC results were flagged with a “J” data qualifier indicating that the results were greater than the MDL but less than the RL.

The VOC concentrations in sediments were below SSSLs. Trichlorofluoromethane concentrations exceeded the ESV at two sample locations (FTA-107-SW/SD01 and FTA-107-SW/SD03).

Semivolatile Organic Compounds. SVOCs were not detected in the sediment samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

Total Organic Carbon. TOC was detected in each of the sediment samples. TOC concentrations ranged from 6,190 mg/kg to 9,500 mg/kg. The TOC results are summarized in Appendix D.

Grain Size. The results of grain size analysis for sediment samples are included in Appendix D.

6.0 Summary and Conclusions and Recommendations

IT, under contract to USACE, completed a SI at the Former Smoke Area, Choccolocco Corridor Parcel 107(7), at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site, and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at Parcel 107(7) consisted of the sampling and analyses of two depositional soil samples, four surface soil samples, four subsurface soil samples, three surface water samples, and three sediment samples.

Chemical analyses of samples collected at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), indicate that metals, VOCs, and SVOCs were detected in the environmental media sampled. Analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998).

The potential threat to human receptors is expected to be low. Although the site is located within an undeveloped area of the Choccolocco Corridor owned by the State of Alabama, the soils data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future land use. With the exception of manganese in three surface soil samples, the metals concentrations that exceeded SSSLs were below the respective background concentration. However, the manganese concentrations were within the range of background values determined by SAIC (1998) and do not pose an unacceptable risk to human health. VOC and SVOC concentrations in site media were below SSSLs.

The potential impact to ecological receptors is also expected to be minimal. The concentrations of six metals (barium, beryllium, copper, manganese, mercury, and selenium) exceeded ESVs and their respective background concentration in surface and depositional soils at Parcel 107(7). With the exception of beryllium (three sample locations) and copper (one sample location), these metals concentrations were within the range of background values determined by SAIC (1998) (Appendix F).

The VOC trichlorofluoromethane was detected in two sediment samples at concentrations (0.0045 mg/kg and 0.0046 mg/kg) marginally exceeding the ESV (0.00307 mg/kg).

Based on the results of the SI, past operations at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7), do not appear to have adversely impacted the environment. The metals and chemical constituents detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT recommends “No Further Action” and unrestricted reuse with regard to hazardous, toxic, and radioactive waste at the Former Smoke Area, Choccolocco Corridor, Parcel 107(7).

7.0 References

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	Amber
ANAD	Anniston Army Depot
APT	armor piercing tracer
ASP	Ammunition Supply Point
ASR	Archives Search Report, July 1999
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BFB	bromofluorobenzene
bgs	below ground surface
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
BZ	breathing zone
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CFC	chlorofluorocarbon
CG	cyanogen chloride
ch	inorganic clays of high plasticity
CK	carbonyl chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
COC	chain of custody

COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare materials, clear wide mouth
CX	dichloroformoxime
D	duplicate
DANC	decontamination agent, non-corrosive
°C	degrees Celsius
°F	degrees Fahrenheit
DDT	dichlorodiphenyltrichloroethane
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered

FMP 1300	Former Motor Pool 1300 Site
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	fire training area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO ₃	nitric acid
hr	hour
H&S	health and safety
HSA	hollow stem auger
HTRW	hazardous, toxic, and radioactive waste
I	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion

List of Abbreviations and Acronyms (Continued)

Inh	inhalation	ND	not detected	qty	quantity
IP	ionization potential	NE	no evidence	Qual	qualifier
IPS	International Pipe Standard	NFA	No Further Action	R	rejected
IRDMIS	Installation Restoration Data Management Information System	ng/L	nanograms per liter	RCRA	Resource Conservation and Recovery Act
IT	IT Corporation	NGVD	National Geodetic Vertical Datum	ReB3	Rarden silty clay loams
ITEMS	IT Environmental Management System TM	NIC	notice of intended change	REG	field sample
J	estimated concentration	NIOSH	National Institute for Occupational Safety and Health	REL	recommended exposure limit
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	No.	number	RFA	request for analysis
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	NOAA	National Oceanic and Atmospheric Administration	RI	remedial investigation
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	NR	not requested	RL	reporting limit
K	conductivity	ns	nanosecond	RPD	relative percent difference
L	lewisite; liter	N-S	north to south	RRF	relative response factor
LC ₅₀	lethal concentration for 50 percent of population tested	nT	nanotesla	RSD	relative standard deviation
LD ₅₀	lethal dose for 50 percent of population tested	NTU	nephelometric turbidity unit	RTK	real-time kinematic
l	liter	O&G	oil and grease	SAD	South Atlantic Division
LCS	laboratory control sample	OD	outside diameter	SAE	Society of Automotive Engineers
LEL	lower explosive limit	OE	ordnance and explosives	SAIC	Science Applications International Corporation
LT	less than the certified reporting limit	oh	organic clays of medium to high plasticity	SAP	installation-wide sampling and analysis plan
max	maximum	ol	organic silts and organic silty clays of low plasticity	sc	clayey sands; sand-clay mixtures
MDL	method detection limit	OP	organophosphorus	Sch.	schedule
mg/kg	milligrams per kilogram	OSHA	Occupational Safety and Health Administration	SD	sediment
mg/L	milligrams per liter	OWS	oil/water separator	SDG	sample delivery group
mg/m ³	milligrams per cubic meter	oz	ounce	SDZ	safe distance zone
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	PAH	polynuclear aromatic hydrocarbon	SEMS	Southern Environmental Management & Specialties
MHz	megahertz	Pb	lead	SFSP	site-specific field sampling plan
µg/g	micrograms per gram	PCB	polychlorinated biphenyl	SGF	standard grade fuels
µg/kg	micrograms per kilogram	PCE	perchlorethene	SHP	installation-wide safety and health plan
µg/L	micrograms per liter	PDS	Personnel Decontamination Station	SI	site investigation
µmhos/cm	micromhos per centimer	PEL	permissible exposure limit	sm	silty sands; sand-silt mixtures
min	minimum	Pest.	pesticide	SOP	standard operating procedure
MINICAMS	miniature continuous air sampling system	PG	professional geologist	sp	poorly graded sands; gravelly sands
ml	inorganic silts and very fine sands	PID	photoionization detector	SP	sump pump
mL	milliliter	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes	Ss	stony rough land, sandstone series
mm	millimeter	POL	petroleum, oils, and lubricants	SS	surface soil
MOGAS	motor vehicle gasoline	PP	peristaltic pump	SSC	site-specific chemical
MPA	methyl phosphonic acid	ppb	parts per billion	SSHO	site safety and health officer
MR	molasses residue	PPE	personal protective equipment	SSHP	site-specific safety and health plan
MS	matrix spike	ppm	parts per million	SSSL	site-specific screening level
mS/cm	milliSiemens per centimeter	PPMP	Print Plant Motor Pool	STB	supertropical bleach
MSD	matrix spike duplicate	ppt	parts per thousand	STEL	short-term exposure limit
msl	mean sea level	PSSC	potential site-specific chemical	STOLS	Surface Towed Ordnance Locator System [®]
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded	pt	peat or other highly organic silts	Std. units	standard units
mV	millivolts	PVC	polyvinyl chloride	SU	standard unit
MW	monitoring well	QA	quality assurance	SVOC	semivolatile organic compound
N/A	not applicable; not available	QA/QC	quality assurance/quality control	SW	surface water
NAD	North American Datum	QAP	installation-wide quality assurance plan	SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>
NAD83	North American Datum of 1983	QC	quality control	SZ	support zone
NAVD88	North American Vertical Datum of 1988	QST	QST Environmental Inc.	TAL	target analyte list

List of Abbreviations and Acronyms (Continued)

TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validated qualifier
VX	nerve agent (O-ethyl-S- [diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd ³	cubic yards

APPENDIX A

**SAMPLE COLLECTION LOGS AND
ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS**

SAMPLE COLLECTION LOGS

CHAIN-OF-CUSTODY RECORDS

APPENDIX B

BORING LOGS

APPENDIX C

SURVEY DATA

Appendix C

Survey Data

Former Smoke Area, Choccolocco Corridor, Parcel 107(7) Fort McClellan, Calhoun County, Alabama

Sample Location	Northing	Easting	Ground Elevation (ft msl)	Top of Casing Elevation (ft msl)
FTA-107-DEP01	1166094.16	694254.84	738.41	NA
FTA-107-DEP02	1166044.36	694321.52	741.29	NA
FTA-107-GP01	1166186.80	693689.13	754.57	NA
FTA-107-GP02	1166240.12	693841.31	746.76	NA
FTA-107-GP03	1166072.71	693970.35	740.68	NA
FTA-107-GP04	1166062.32	694245.13	741.47	NA
FTA-107-SW/SD01	1166501.60	693743.60	751.16	NA
FTA-107-SW/SD02	1166155.45	694128.70	745.85	NA
FTA-107-SW/SD03	1166103.43	694335.41	736.05	NA

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.

Elevations referenced to the North American Vertical Datum of 1988.

ft msl - Feet mean sea level.

NA - Not available, temporary well not installed.

APPENDIX D

SUMMARY OF VALIDATED ANALYTICAL DATA

APPENDIX E

DATA VALIDATION SUMMARY REPORT

APPENDIX F

SUMMARY STATISTICS FOR BACKGROUND MEDIA, FORT MCCLELLAN, ALABAMA